

PHNL030306

PCT/IB2004/050309

12

## CLAIMS:

1. A track and hold circuit (1) comprising:
  - a linear amplifier (2) receiving a differential analog signal (D+, D-) and being controlled by a first binary clock signal (H+) having a first phase and a second phase,  
5 the linear amplifier (2) providing a feed-forward input signal substantially equal with the differential analog signal (D+, D-),
    - a pseudo latch circuit (3) being controlled by a second binary clock signal (H-) for memorizing the feed forward input signal and for providing a differential output signal (LD+, LD-) substantially equal with the feed-forward input signal during the second  
10 phase of the first binary clock signal (H-), the second binary clock signal being substantially in anti-phase with the first binary clock signal (H+).
2. A track and hold circuit (1) as claimed in claim 1, wherein the linear amplifier (2) comprises a first common source pair of transistors (T1, T2) biased in their common  
15 source terminals by a switchable current source ( $I_{DC}$ ) via a first switch (S1) controlled by the first binary clock signal (H+) and receiving at their gates the differential analog signal (D+, D-), the linear amplifier (2) further comprising a common drain transistor (T3) having a gate coupled via substantially equal resistors (R) to the gates of the first common source pair of transistors (T1, T2) for determining drain currents flowing through the pair of transistors (T1,  
20 T2).
3. A track and hold circuit (1) as claimed in claim 1, wherein the pseudo latch circuit (3) comprises a second common source pair of transistors (T4, T5) being biased in their common source terminals by a switchable current source ( $I_{DC}$ ) via a second switch (S2)  
25 controlled by the second binary clock signal (H-) and receiving at their gates the signal provided by the linear amplifier (2), the pseudo latch circuit (3) further comprising a common drain transistor (T6) having a gate coupled via substantially equal resistors ( $R_g$ ) to the respective gates of the second differential transistor pair (T4, T5) for reducing bias currents through the second transistor pair (T4, T5), the second transistor pair (T4, T5) being cross  
30 coupled.
4. A track and hold circuit (1) as claimed in claim 2, wherein the linear amplifier (2) further comprises a pair of capacitors cross-coupled between a drain of a transistor of the

PHNL030306

PCT/IB2004/050309

13

first transistor pair (T1, T2) and the gates of the other transistor of the first transistor pair (T2, T1), respectively for reducing crosstalk currents at the amplifier's output.

5. A track and hold circuit (1) comprising a cascaded coupling of two substantially identical linear amplifiers (2) as claimed in claim 4, for better isolating the input data from the pseudo latch circuit (3).
6. A tracking data cell (10) comprising a pair of track and hold circuits (1, 1') as claimed in claim 1 coupled to a first multiplexer (5), a clock signal (H+, H-) being inputted substantially in anti-phase in the respective track and hold circuits (1, 1') for determining a receipt of a data signal (D+, D-) having a rate, said track and hold circuits (1, 1') providing an output signal (O) having a substantially half rate.
7. A Phase Locked Loop comprising a first tracking data cell (10) and a second tracking data cell (10') as claimed in claim 6 receiving an input signal (D+, D-) and being controlled by a respective quadrature clock signals (Hi, Hq) generated by a voltage controlled oscillator (VCO), the first tracking data cell (10) being coupled to a hard limiter (11) providing a binary data out signal (DO), the second tracking data cell being coupled to a delay element (12) providing an input signal for a pair of track and hold circuits (1, 1'), the track and hold circuits being controlled by the binary output signal (DO) and providing a frequency correction signal (E) for the voltage controlled oscillator (VCO) via a low-pass filter (LPF).
8. A Phase Locked Loop as claimed in claim 7 further comprising a frequency error detector comprising an input circuit (50) including:
  - a first track and hold circuit (30) and a second track and hold circuit (30') as claimed in Claim 1, receiving the frequency correction signal (E) and being controlled by the binary output signal (DO), said first and second track and hold circuits (30, 30') being coupled to a multiplexer means (25) controlled by the binary output signal (DO),
  - the multiplexer means (25) being coupled to a slicer (35) providing a signal which is subtracted from the frequency correction signal (E) in a subtractor (S), the subtractor (S) providing a signal (FD) indicative for a frequency error between the frequency correction signal (E) and the binary output signal (DO).

PHNL030306

PCT/IB2004/050309

14

9. A phase detector comprising a first input circuit (500) and second input circuit (500') as claimed in claim 8, first and second input circuits (500, 500') receiving respective quadrature clock signals (Hq, Hi), being controlled by input data signal (D) and providing respective first output signal (A) and second output signal (B), the first output signal (A) and
- 5 its inverse replica being inputted to an output multiplexer (OM) controlled by the second output signal (B) via a hard limiter (250) and providing a signal (PD) indicative for a phase error between the input data signal and clock signal.